

CLAIMS:

1. An isolated polypeptide comprising an amino acid sequence which has at least 85% identity to an amino acid sequence selected from the group consisting of SEQ Group 2 ,
5 over the entire length of said sequence from SEQ Group 2 .
2. An isolated polypeptide as claimed in claim 1 in which the amino acid sequence has at least 95% identity to an amino acid sequence selected from the group consisting of SEQ Group 2, over the entire length of said sequence from SEQ Group 2 .
10
3. The polypeptide as claimed in claim 1 comprising an amino acid sequence selected from the group consisting of SEQ Group 2.
4. An isolated polypeptide of SEQ Group 2 .
15
5. An immunogenic fragment of the polypeptide as claimed in any one of claims 1 to 4 in which the immunogenic activity of said immunogenic fragment is substantially the same as the polypeptide of SEQ Group 2 .
- 20 6. A polypeptide as claimed in any of claims 1 to 5 wherein said polypeptide is part of a larger fusion protein.
7. An isolated polynucleotide encoding a polypeptide as claimed in any of claims 1 to 6.
- 25 8. An isolated polynucleotide comprising a nucleotide sequence encoding a polypeptide that has at least 85% identity to an amino acid sequence selected from SEQ Group 2 over the entire length of said sequence from SEQ Group 2; or a nucleotide sequence complementary to said isolated polynucleotide.
- 30 9. An isolated polynucleotide comprising a nucleotide sequence that has at least 85% identity to a nucleotide sequence encoding a polypeptide selected from SEQ Group 2 over

the entire coding region; or a nucleotide sequence complementary to said isolated polynucleotide.

10. An isolated polynucleotide which comprises a nucleotide sequence which has at least
5 85% identity to a DNA sequence selected from SEQ Group 1 over the entire length of said
sequence from SEQ Group 1; or a nucleotide sequence complementary to said isolated
polynucleotide.

11. The isolated polynucleotide as claimed in any one of claims 7 to 10 in which the
10 identity is at least 95% to a DNA sequence selected from SEQ Group 1 .

12. An isolated polynucleotide comprising a nucleotide sequence encoding a polypeptide
selected from SEQ Group 2 .

13. An isolated polynucleotide comprising a polynucleotide selected from SEQ Group 1.

14. An isolated polynucleotide comprising a nucleotide sequence encoding a polypeptide
selected from SEQ Group 2 obtainable by screening an appropriate library under stringent
hybridization conditions with a labeled probe having the corresponding DNA sequence of
20 SEQ Group 1 or a fragment thereof.

15. An expression vector or a recombinant live microorganism comprising an isolated
polynucleotide according to any one of claims 7 - 14.

16. A host cell comprising the expression vector of claim 15 or a subcellular fraction or a
membrane of said host cell expressing an isolated polypeptide comprising an amino acid
sequence that has at least 85% identity to an amino acid sequence selected from the group
consisting of SEQ Group 2 .

17. A process for producing a polypeptide of claims 1 to 6 comprising culturing a host cell of claim 16 under conditions sufficient for the production of said polypeptide and recovering the polypeptide from the culture medium.
- 5 18. A process for expressing a polynucleotide of any one of claims 7 – 14 comprising transforming a host cell with the expression vector comprising at least one of said polynucleotides and culturing said host cell under conditions sufficient for expression of any one of said polynucleotides.
- 10 19. A vaccine composition comprising an effective amount of the polypeptide of any one of claims 1 to 6 and a pharmaceutically acceptable carrier.
20. A vaccine composition comprising an effective amount of the polynucleotide of any one of claims 7 to 14 and a pharmaceutically effective carrier.
- 15 21. The vaccine composition according to either one of claims 19 or 20 wherein said composition comprises at least one other non typeable *H. influenzae* antigen.
- 20 22. An antibody immunospecific for the polypeptide or immunological fragment as claimed in any one of claims 1 to 6.
23. A method of diagnosing a non typeable *H. influenzae* infection, comprising identifying a polypeptide as claimed in any one of claims 1 - 6, or an antibody that is immunospecific for said polypeptide, present within a biological sample from an animal suspected of
- 25 having such an infection.
24. A method of diagnosing a non typeable *H. influenzae* infection or the presence of non typeable *H. influenzae* in a sample, comprising the step of identifying the stringent hybridisation of a polynucleotide probe comprising at least 15 nucleotides from a
- 30 polynucleotide selected from SEQ Group 1 to bacterial genomic DNA present within a

sample, optionally a biological sample taken from an animal suspected of having a non typeable *H. influenzae* infection.

25. Use of a composition comprising an immunologically effective amount of a polypeptide as claimed in any one of claims 1 – 6 in the preparation of a medicament for use in generating an immune response in an animal.
26. Use of a composition comprising an immunologically effective amount of a polynucleotide as claimed in any one of claims 7 - 14 in the preparation of a medicament for use in generating an immune response in an animal.
27. A therapeutic composition useful in treating humans with non typeable *H. influenzae* disease comprising at least one antibody directed against the polypeptide of claims 1 – 6 and a suitable pharmaceutical carrier.
28. A mutated ntHi strain, wherein the gene shown in SEQ ID NO:1 has been engineered such that it either expresses its gene product constitutively, or it has been substantially knocked-out so as to switch off functional expression of its gene product.
29. Lipo-oligosaccharide isolated from the mutated ntHi strain of claim 28.
30. A method for preparing an oligosaccharide in vitro comprising the steps of contacting a reaction mixture comprising an activated saccharide residue to an acceptor moiety comprising a further saccharide residue in the presence of the glycosyltransferase having an amino acid sequence of SEQ ID NO:2, or a functionally active fragment thereof.